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ROCKS and MINERALS

Vol. 5. No. 1. MARCH, 1930 Whole No. 15

—Courtesy of *Dr. H. C. Dake.*

Ritter Hot Springs, Oregon, a noted Zeolite locality.
The Zeolites are found in the erroded lavas shown.

SPECIAL ARTICLES

SOME MINERALS AND COLLECTIONS IN THE U. S. NATIONAL MUSEUM. By Dr. W. F. Foshag.

MILLERITE. By W. E. Howarth.

BOULANGERITE AND ASSOCIATED MINERALS OF THE CLEVELAND MINE, STEVENS CO., WASH. By Charles O. Fernquist.

A MINERAL COLLECTION VACATION. By Mrs. H. C. Dake.

THE MAGAZINE FOR COLLECTORS

THE BULLETIN BOARD

ROCKS AND MINERALS TO CONTINUE QUARTERLY

It is with sincere regret we have to announce that our efforts to make ROCKS AND MINERALS a monthly did not materialize. Though we received a large number of favorable replies, they were not, however, of sufficient number as to warrant the greater expense and more work that it would involve to have the magazine come out monthly.

A considerable number of members wrote in that they would prefer to have ROCKS AND MINERALS continue as a quarterly.

Nevertheless, we are very much gratified by the interest manifested by so many of our members who not only wish to have the magazine come out monthly but have actually sent in checks to cover the extra assessment that would have been made.

Perhaps in 1931 we may be more successful.

TWO NEW MINERAL CLUBS FORMED

We are pleased to announce the formation of two new mineral clubs which should prove of interest to our members.

The Newark Museum Association, 49 Washington St., Newark, N. J., have organized a mineral club for boys and girls of junior high and high school age. It will have its own officers and an advisor who will be a member of the Science Department staff. A ten week program has been arranged, the object of which is to acquaint the members with the fundamentals of mineral identification. By the end of this period the students should be able to recognize about fifty common species. The members will be supplied with minerals from the Museum's distribution material; and they are free to use the simple testing apparatus; and in many cases will be allowed to keep the specimens which they may identify. The program will end with a grand "spot quiz," in which the winners will be awarded worthwhile specimens. After ten weeks have elapsed, the members have the choice of taking advanced work under museum supervision or continuing as an independent group.

Some of the students who are mineral enthusiasts in the Boys' High School, Brooklyn, N. Y., have formed a mineral club whose purpose is to create an interest in the fascinating study of minerals and their collecting. An exhibition of minerals in the school has already been made and it is hoped that in this way enough interest may be manifested among the students so that the club may grow and prosper. Morris Goldgell has been elected President of the club.

We hope that the formation of these clubs may inspire some of our members to organize similar clubs in their respective schools or cities.

SPECIAL NOTICE

We have had quite a number of inquiries for an exchange department in ROCKS AND MINERALS and so we have decided to open it. On adv. page 3 is an announcement to this effect and we hope that our members will be interested and will take advantage of this feature. We will be glad to have any suggestions that our readers can offer.

WANTED: Correspondents in all parts of the world who will be kind enough to send us notes and news items on minerals, etc., that they think may be interesting to the subscribers of ROCKS and MINERALS. Such as are available we shall be very glad to print in the magazine.

Science direct

ROCKS AND MINERALS

The Magazine for Collectors

Published Quarterly

Peter Zodac
Editor and Publisher

The Official Journal of The Rocks and Minerals Association

Vol. 5, No. 1 MARCH, 1930 Whole No. 15

CONTENTS

Some Minerals and Collections in the U. S. National Museum. *By Dr. W. F. Foshag* 1
Millerite. *By W. E. Howarth* 3
The Sluice Box. *By A. Riffle* 5
Boulangerite and Associated Minerals of the Cleveland Mine, Stevens County, Washington. *By Charles O. Fernquist* 6
A Mineral Collecting Vacation. *By Mrs. H. C. Dake* 10
Little Journeys. *By Albert C. Bates* 12
Mineral Collecting in Southwestern Connecticut. *By Samuel C. Brown* 13
Museums of the World 14
Gold Discovered 65 years ago in Last Chance Gulch, Montana 16
Field Museum Notes and News Items 18
Bureau of Mines Notes and News Items 20
Mineral Localities Information Department 21
The Gem Department. *By Gilbert Hart* 22
U. S. Civil Service Opportunities 23
The Brain of Man. *By Joseph N. Prokes* 24
Possible Canadian Production of Radium Ore 24
Comment and Criticism 25
A Compilation of Gem Names. *By Gilbert Hart* 26
With Our Members 28
With Our Contributors 29
The Rocks and Minerals Association 30
Publications Recently Received 30
The President's Page 31
Membership Department 32
General Index of Authors and Contents 36

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A limited supply of back numbers of ROCKS AND MINERALS is still available and they can be obtained at the following prices:

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Vol. 2—Nos. 1, 2, 3 and 4—35c each
Vol. 3—Nos. 1, 2 and 4—40c each
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ROCKS and MINERALS
Peekskill, N. Y.

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A magazine for the Collector, Swapper, and the Outdoor Sportsman. Many departments. Special articles on gems and minerals. January number had an article on jasper, how to cut and polish. Also a serial "The Story of Gold", by Richard Buhlis. 32 large pages, finely illustrated on book paper. Colored cover. Monthly. Subscription price only 50c. 6 mos. trial 25c. Sample copy 10c.

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P. S.—Saw your Ad. in Rocks and Minerals

AN EXCHANGE DEPARTMENT

We have had quite a number of inquiries regarding an exchange department in ROCKS and MINERALS but no one has sent in any suggestions how such a department should be formed or conducted. There is, however, such a keen demand for a department of this kind that we have decided to form it and we hope that our plan may meet with the approval of all and that many will take advantage of it.

To avoid the disappointing exchanges that many may have often experienced, we have prepared a set of rules which we hope will be followed by all. Those who may have suggestions we would be very glad to hear from them.

It is our plan to list collectors geographically—by states, and each name will carry a symbol, A (advanced collector), M (medium collector), and B (beginner).

Listings are 50c per year for *one line* only.

The following is how the department will appear with rules and two sample names:

Exchange Department

Listings 50c per year—*One line* only

A—Advanced Collector M—Medium Collector B—Beginner

The following rules must be followed:

1—Get together the minerals you wish to exchange. Throw out all the poor ones. Those covered with dirt should be washed with water to improve them.

2—Label them accurately—name of mineral and place where found. Labels should be carefully written out in ink or else printed.

3—If you do not know the values of minerals write to a reliable dealer for a selection covering the ones you can supply and thus get some idea what yours may be worth. The money spent in this way is a good investment.

4—Have a list printed of what you can supply describing each mineral.

5—Send a copy of your list to the collector with whom you wish to exchange and wait for a reply containing his list.

6—Pick the minerals off his list that you want and so write him. On receipt of your letter he will reply stating what he wishes from your list. In this way some satisfactory arrangement can be made that will be pleasing to both.

7—Under no condition should you send minerals to another without him authorizing you to.

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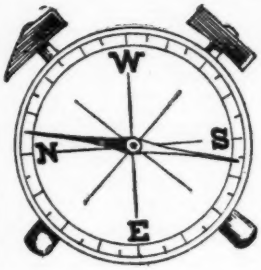
P. Zodac (M), 157 Wells St., Peekskill	Rocks and Minerals (A), Peekskill

P. S.—Saw your Ad. in Rocks and Minerals



Which Is The Most Beautiful Mineral?

We want the opinion of at least 100 readers of ROCKS and MINERALS. We have an interesting proposition to make to them. Here it is.

1. Write us **briefly** naming the mineral you think most beautiful in all the world.

2. State whether you have a fine specimen of this mineral in your collection.

3. Upon receipt of your reply to the above inquiries, we will mail you **absolutely free** a good crystal of Corundum or Cassiterite or Ruby Spinel—whichever you prefer.

The Mineral You Think Most Beautiful

Is certainly in Ward's great stock, and probably we have many choice specimens of it. Why do you not satisfy your aesthetic taste and secure a superfine specimen of it? Ask us what we can offer you.

There is an inspiration about the possession of a truly beautiful mineral specimen. If you look at it often, it brightens your life, makes the burdens of the day lighter, brings you cheerfulness, enables you to do more work and do it easier.

A beautiful mineral specimen, where you can see it, is one of the best investments you can make.

If you want our guidance in your selection write for a copy of our Price List No. 291, "Good Minerals".

Remember we aim to carry in stock every obtainable species and that we sell without net profit.

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The Frank A. Ward Foundation of Natural Science

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For 68 years located at 84-102 College Avenue, Rochester, N. Y.

SOME MINERALS AND COLLECTIONS IN THE U. S. NATIONAL MUSEUM

By Dr. W. F. Foshag,

Curator, Mineralogy and Petrology, U. S. National Museum,
Washington, D. C.

(Written by permission of the Secretary, U. S. National Museum)

The mineralogical collections of the United States National Museum have increased so much in the last few years that it is now one of the leading collections of the world. It is particularly complete, not only in species but in the numerous varieties and doubtful minerals. Of the 824 numbered species listed in Dana only eight are now unrepresented and the newer species are similarly complete. This collection includes, besides the original national collections, the two fine collections of Col. Washington A. Roebling and Frederick Canfield, recently acquired.

The collections are divided into two series, one an exhibition series, includes the material of more popular interest; the other, a scientific series of 40,000 specimens, is used for scientific investigations and includes many of the rarer species and many localities not represented in the exhibition series.

The exhibition series consists of (1) a systematic series of 2,500 specimens, arranged according to the classification of Dana and includes about 750 species; (2) a series of 500 large specimens up to 4 feet across of good quality arranged for show purposes; (3) the Isaac Lea Collection of Gems, a comprehensive series of cut gems numbering about 5,000; and (4) miscellaneous small collections illustrating various phases of mineralogy.

There are a number of individual specimens in the collections that are of more than ordinary interest. One of the most striking is a group of huge gypsum crystals collected at Naica, Chihuahua, Mexico. It consists of three adjacent groups of crystals mounted as they were originally found in the cave and set in an artificial background. Fifteen crystals are contained in this group, the largest 5 feet long and the smallest 3 feet.

Among the gold specimens are some fine crystals from California; a cube of pyrite measuring 2 inches along its outer edge with more than 130 small crystals of gold attached to its surface from Snettisham District, Alaska; a large nugget from the Rapidan River, Virginia. A specimen of great historical interest is the original flake of gold found by John Marshall in Sutter's Mill in 1848. There is also a large platinum nugget from the Urals weighing 15 ounces while the Roebling collection contains a platinum nugget of 17 ounces from the Choco River, Colombia.

There are a series of 30 Arkansas diamonds, the largest crystal in the Roebling collection weighs 18 carats. A large black diamond cube weighing 64 carats from the Wesselton Mine, Kimberly is also in the Roebling collection.

Among the sulfide minerals are a group of well formed pyrrhotite crystals on calcite from the Potosi mine, Santa Eulalia, Chihuahua, Mexico; a fine slab of bournonite crystals from Bolivia; a beautiful group of pyrargyrite crystals from Mexico and two huge crystals of argyrodite from Bolivia.

A number of fine opal masses are in the collection, including a mass of black opal with vivid flashes of red, blue and green colors from Virgin Valley, Nevada. It weighs over 17 ounces and is said to be one of the largest masses of precious opal found.

Two large chrysoberyl twins from Brazil measuring 3 to 4 inches in diameter are believed to be unique.

The carbonates include some fine large crystals of calcite from the Joplin district; good slabs and masses of mala-

chite and azurite from Bisbee; a fine, large cerussite twin weighing over 2 pounds from Tsumeb, Africa.

Several large and fine beryl crystals, one a light emerald-green crystal weighing over 2 pounds and another a fine hexagonal prism of light greenish-yellow color, almost flawless and weighing 2 pounds are included in the collection. A light blue one is beautifully terminated by the pyramid and base, while an emerald crystal from Stony Point, North Carolina, one of the largest found at this locality, weighs 9 ounces.

The topaz specimens include two sections of the largest topazes found in Brazil, one weighing 45 pounds, the other 95 pounds. A large pale blue crystal from Texas is said to be the largest found in North America. The collection also contains three fine yellow crystals from Brazil approximately 8 to 10 inches in length. A deeply corroded one from Burma, India, weighs about 7½ pounds. There is also a fine group of blue topazes from Siberia on a base of albite and smoky quartz crystals.

Tourmaline is represented by a magnificent group of two large pink and green crystals set upon a base of large quartz crystals. Included also are a number of the fine doubly terminated and varicolored crystals from Mesa Grande, California. A large euclase, partly bounded by crystal faces from Brazil is of exceptional size and weighs 4 ounces.

Other specimens that may be specifically mentioned are two fine titanite twins from Bridgewater, Pennsylvania; a specimen of crystallized turquoise; a beautiful large purple apatite from Maine; a group of very large colemanite crystals and others of similar character.

Both the Canfield and Roebling collections are rich in Franklin Furnace, N. J. minerals, those of the Canfield collection dating back to the early days of mining in that area and includes fine and large crystals of franklinite, spinel, augite, garnet and other minerals; while the Roebling collection is especially rich in the newer rare minerals and embraces many of the finest of these specimens found.

The Isaac Lea gem collection contains about 5,000 cut gems and carved objects. This collection is particularly complete as to varieties and contains some gems of exceptional quality. It contains an alexandrite of 65 carats, a fine Brazilian emerald of 10 carats, a fine blue topaz of 44 carats from Maine, a beautiful star ruby, a small series of cut diamonds showing the range of color, a fine matched series of cut sphenes and several "landscape" agates of exceptional quality.

The Roebling collection likewise contains some outstanding cut gems. A benitoite of 7 carats is the largest flawless stone of this mineral found. Of special note is a fine reddish-yellow topaz from Brazil of 95 carats, a peridot of 310 carats from the Isle of St. John, a Siberian topaz of 400 carats, a fine blue euclase and several others worthy of mention.

The collection of ores embraces about 30,000 specimens and includes many rich and exceptional specimens of this character. The Ontonagan copper boulder weighing about 3 tons is a historical piece, having been found in 1766. A mass of placer gravel from Dutch Flat, in California, is rich in visible gold nuggets. There is also a huge mass of scheelite weighing about a ton and shows the complete width of the vein. Many of these ore specimens are large slabs and show the associated mineral and vein and other structures. This collection is said to be one of the finest in existence.

If any of our readers run across articles or news items in newspapers or magazines in which ROCKS AND MINERALS or any of its articles are mentioned, we would consider it a favor if they would advise us, giving name of periodical and date of issue. Clippings would be gratefully appreciated.

We are also interested in securing a wider circulation for ROCKS AND MINERALS among schools, colleges, and libraries. Can any of our readers give us some suggestion?

We also believe that every boy and girl scout troop in the country should subscribe to ROCKS AND MINERALS and have the magazine come regularly to them. These active and alert youngsters, who are the boys and girls of today but the men and women of tomorrow, should be keenly interested in minerals and study them at every opportunity. Unless a boy or girl learns to like minerals at an early age, the chances are strong that they will never become interested as they grow older. Here is an excellent field for some missionary work among our "young Americans"!

MILLERITE

By W. E. Howarth
National Museum of Wales,
Cardiff, England.

Millerite is the name given to the naturally occurring sulphide of nickel, NiS, which is recorded in the sixth edition of Dana's *System of Mineralogy* as having been found at Joachimsthal in Bohemia; Johannergeorgenstadt; Pribram; Riechelsdorf; Andreasberg; Himmelfahrt Mine in Saxony; Micheroux, Belgium; Cornwall, England; near Merthyr Tydfil, Wales; and in various localities in the United States.

The writer has collaborated with Dr. F. J. North[1] for some years in collecting specimens and records of the mineral in South Wales, as in addition to being beautiful and comparatively rare, it was thought that the distribution of millerite might help in the correlation of coal seams with which it is associated, so for, however, with no conclusive results.

Millerite usually occurs as tufts or radiated groups of very slender or even capillary rhombohedral crystals. This capillary or hair-like character gave rise to the names 'hair pyrites' (haarkies) or 'capillary pyrites', and is to some extent responsible for the rarity of the mineral in collections; for the rocks in which it occurs are tough and the blow required to break them often dislodges and shatters the crystals into minute fragments, so that they escape notice. The fine hair-like crystals are good natural electroscopes so that specimens in glass cases, or in boxes with glass tops are likely to be damaged unless placed well away from the glass; for if, as in the process of dusting, the latter is rubbed with a dry cloth sufficiently vigorously to be given an electric charge, the difference in potential between it and the crystal becomes sufficient to attract them to the glass and so destroy the crystal aggregate, indeed a number of specimens in the collection of the National Museum of Wales were destroyed in this way during the Great War when no responsible official remained in the Geological Department.

When fresh, the color of millerite is brassy yellow, but oxidation gives first a bronze-yellow tinge, and later an iridescent tarnish. Some of the millerite accompanying the Elled Vein (coal seam) at Bedwellty, Monmouthshire, England, was found to be partly oxidized to a yellowish green substance consisting of soluble nickel sulphate (probably the hydrated nickel sulphate Morenosite $NiSO_4 . 7H_2O$, which has been found accompanying millerite and magnetite at Cape Hortegal in Galicia, Spain); together with a sulphate insoluble in water but soluble in dilute mineral acid, presumably a basic nickel sulphate, although there was insufficient for quantitative analysis.

OCCURRENCE IN SOUTH WALES

Millerite is found in most cases in the spaces that accompany cracks in the concretions of clay ironstone which are a common feature of the Coal Measures of England and Wales. These clay ironstone concretions are essentially chalybite (siderite) with a considerable amount of argillaceous material, so that they rarely average more than 25%—28% iron and on that account, and also because they contain sulphur, phosphorus, and silica, are not now mined to any great extent as an ore of iron. The concretionary ironstone forms flat bands or layers of isolated bun-shaped nodules ('pins') at various horizons in English and Welsh Coal Measures, but only in South Wales do they contain millerite.

Opinions as to the origin of these concretionary nodules differ, but they are very interesting, mineralogically, as in addition to millerite which may or may not be present, the septarian cracks are

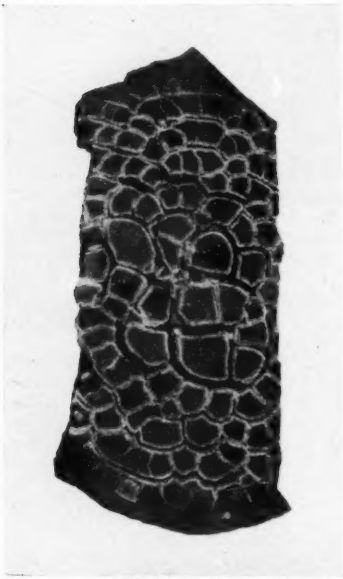


Photo by W. E. Howarth.

Length of Specimen 14 inches

Figure 1—Portion of a clay ironstone concretion from Ynysddu, Monmouthshire, showing the polygonal cracking in the center and concentric cracks near the margin. The lining of the cracks is dolomite and the cavities contain small quantities of millerite and other metallic sulphides.

Photo by W. E. Howarth.

Natural size

Figure II. Millerite on dolomite—a fine radiating mass in cavity in clay ironstone associated with the Seven Feet Seam of coal at Treharris, Glamorgan.

always lined with small crystals of quartz, calcite, dolomite, or ankerite, and this lining may be speckled by crystals of one or more of the minerals, chalcopyrite, pyrite, galena, barytes, blende, linnaeite, kaolinite and hatchettine. In addition, the remaining space in the cracks may be infilled by large secondary calcite, barytes, or quartz crystals, which are beautifully glass clear.

The occurrence of linnaeite (sulphide of cobalt Co_3S_4) at five localities in South Wales is particularly interesting though not surprising, in view of the close relationship of cobalt and nickel.

In one instance the millerite occurred in a mass of black pyrite ('brass') actually in the coal of the Two Feet Nine Seam at Ferndale, Glamorgan, Wales, but all other specimens were found in the clay ironstone nodules described, or in incipient nodules in the black Coal Measures shales.

Where did the nickel come from? The problems relating to the source of the nickel and cobalt in the South Wales coalfield are of considerable interest. From the mode of occurrence of the crystals and from the fact that they occur in ironstone nodules, in masses of pyrite and also in the shales where there were cavities in which crystallization could take place, it would appear that the nickel and cobalt were constituents of either the Coal Measure deposits or of the waters in which they accumulated, and were not introduced subsequently, as ores often have been, by mineralizing waters that percolated downwards from some overlying deposits, or that ascended from the depths of the earth's crust during periods of crustal disturbance.

In over 260 analyses of igneous rocks recorded by the United States Geological Survey, the average nickel content is

Photo by W. E. Howarth.

Natural size

Figure III. Millerite penetrating secondary Barytes, Treharris, Glamorgan.

.0274%, while copper is only .01% and lead and zinc even less, so that it is surprising that the last three should be so relatively abundant in vein minerals as compared with nickel. Possibly the reason lies in the fact that nickel is less amenable to the processes by which metals become locally consentrated than are the others. The only kinds of rocks in which nickel and cobalt are of constant occurrence in more than merest traces are the very basic and ultrabasic rocks in magnesium, such as the peridotites. For rocks of this character, one has to go to the Lizard district of Cornwall, England, so that it seems that the presence of millerite and linnaeite in the Coal Measures of South Wales gives further support to the theory that the material of the South Wales Coal Measures came from the southwest.

(1) F. J. North & W. E. Howarth "On the Occurrence of Millerite and Associated Minerals in the Coal Measures of South Wales", *Proceedings of the South Wales Institute of Engineers*, Vol. XLIV NO. 3 (1928), pp. 325-348, Plates I & II.

THE SLUICE BOX

By A. RIFFLE

The southbound passenger train was held up for ten minutes here a few days ago. During the wait a well-dressed gentleman stepped off the train and walked up to "Old Bill", who was sitting on the express truck, and engaged my old friend in conversation. When the train pulled out I stepped up to "Old Bill" and as a greeting said: "Who was your distinguished looking friend, Bill?" He handed me a card reading "John Doe, B. Sc.," and said: 'Must be some kind of an officer in the Boy Scouts 'cordin to that card."

From 1909 when the last issue of *The Mineral Collector* was published until 1926 when the first issue of ROCKS AND MINERALS made its appearance there were 17 years when mineral collectors had no publication except those of a deeply scientific nature. You now have had four years of ROCKS AND MINERALS. Look back upon the entertainment and instruction that has been brought to you through ROCKS AND MINERALS these four years and also no doubt friendships and pleasant associations with fellow collectors that can be traced back to the same source, all of which you otherwise would have missed, then resolve to do something worth while to support the meritorious magazine that the Editor is giving us. Subscriptions, advertisements, contributions and "boosting" in general will all help. Surely you can do something in one of these ways and maybe in all of them.

BOULANGERITE AND ASSOCIATED MINERALS OF THE CLEVELAND MINE, STEVENS COUNTY, WASHINGTON

By Charles O. Fernquist,

Curator of Minerals, Public Museum
Spokane, Washington.

Map of Washington showing location of Stevens County

The minerals and mineral localities of northeastern Washington are not very widely known by mineral collectors; so few specimens from this section are to be found in any of the larger collections. The Cleveland mine, located in the southwestern part of Stevens County, is one of the most interesting mineral localities of this section. The literature on the geology and mineralogy of the district close to the mine is very scant, there being only two reports by the Washington Geological Survey, namely: Bulletin 20, "The Mineral Resources of Stevens County", by Charles E. Weaver, and Bulletin 31, "Lead Deposits of Pend Oreille and Stevens Counties, Washington", by Olaf P. Jenkins.

Stevens County is located near the northeastern corner of the State. The climate is delightful; the summer heat not being too intense, nor the winters too severe. Considerable snow falls in the mountains remaining until late in the spring. The mountain ranges are covered with a good growth of pine timber, sufficient for all mining needs.

The Cleveland mine is close to the summit of the Huckleberry Mountains, a rugged north and south range, the summits of which have altitudes of 4500 to 6000 feet above sea level. The mine is at an altitude of about 4000 feet. About ten miles west of the mine is the Columbia River at an altitude of approximately 1500 feet. On the east side of the mountains there is a broad valley of an altitude near 2000 feet: the Colville valley.

The mine was located about 1892 and it is said that the first operators obtained about $250,000 from ores mined near the surface. Since then the mine has been operated at several short intervals; at which times several shipments have been made. The last period of operation was from 1921 to 1925; since then the mine has been idle. The workings at the mine are open cuts, shafts and tunnels. There is a fifty ton mill and other mine buildings on the property. The nearest railroad point is Springdale, a small town about twenty miles east of the mine, on the branch line of the Great Northern Railroad running north from Spokane. There are good automobile roads to within three miles of the mine. This last section of road is getting in bad shape from lack of improvement on account of the mine not having been in operation for the past several years. From Spokane the mine can be reached by going north to Springdale and then west; or by going west to Davenport and then north to Hunters and on to the mine.

The rocks of the southern end of Huckleberry Mountains are very highly metamorphosed and steeply folded sedimentaries, with a thickness of several thousand feet. They are composed of argillite, dolomitic limestone and quartzite. From lack of fossils, the age of these metamorphic sedimentaries have been rather imperfectly known; being considered to have been deposited some time during the Paleozoic. During the last three years some invertebrate fos-

sils have been collected, by members of the State Geological Survey, consisting of trilobites, brachiopods, pelecypods and crinoids. When these are identified considerable more will be known of the geological history of this little known section. To the southern extremity of the Huckleberry range and east in the valley there is a large granite batholith intrusion; also several basic igneous dikes cutting through the sedimentaries. The batholith and the dikes are of a later age than the metamorphic sedimentaries; probably Mesozoic. The intrusion of the batholith and dikes caused the fractures and shearing in the older sedimentaries allowing the escape of the mineralized gases and solutions from the underlying molten magma, thus forming the different ore deposits of the county during the later stages of cooling. Overlying these Mesozoic igneous formations in the valley, on the east side of the mountains, there are Tertiary basaltic lava flows and lake beds. These lake beds have an abundance of fossil leaves which are of middle to late Miocene age. During the Quarternary period, great ice lobes extended down through the valleys and practically every part of the county shows some effect of glaciation.

The Cleveland mine is a lead-silver property that contains some complex lead-antimony and zinc ores. The ore bodies occur as irregular lenses in a brecciated dolomitic limestone. There is considerable faulting; the ore being associated mostly with the minor faults. On each side of the dolomitic limestone there are black argillites, and a few feet to the west of the lower tunnel there is a large massive quartzite. A large dark colored basic igneous dike is also near the mine.

In May, 1921, L. K. Armstrong, a local mining engineer, made an examination of the mine workings. At this time the late Henry Fair, former curator of mineralogy at the Spokane Museum, and myself, accompanied him. By considerable collecting we were fortunate in procuring nearly all the different minerals known to occur at the mine.

During the first week of August, 1929, Dr. Henry C. Dake of Portland, Oregon, (President of the Rocks and Minerals Association) came through Spokane on a collecting trip. Considering the Cleveland mine one of the most interesting localities, we decided to go there, and were rewarded by procuring a number of interesting specimens. The mine, not having been in operation for some time, the collecting has to be done on the old dumps. By further and more careful collecting, one may be rewarded by adding a few more varieties to those already found. The following list, with a short description, includes all the minerals known to have been found at the mine.

ANKERITE

Ankerite, a calcium-iron carbonate, is found in small yellow rhombohedral crystals in the dolomite at the entrance to one of the tunnels. This ankerite may be considered as a dolomite in which the magnesia has been replaced by iron.

ARAGONITE

Aragonite is a calcium carbonate of an orthorhombic crystal habit. At the Cleveland mine it is found in limonite with an appearance like that of smithsonite and calamine. It is also found in masses of long slender radiating crystals.

ARSENIC

Arsenic has been found in black masses.

ARSENOPYRITE

Arsenopyrite, an iron sulpharsenide, occurs massive and also in small, long, slender prismatic crystals with good terminations in quite spectacular groups.

BARITE

Barite, the sulphate of barium, occurs in a large vein at an adjoining property. It is massive and of a pure white color.

Arsenopyrite Crystal
Cleveland Mine

BINDHEIMITE

Bindheimite, an amorphous hydrous antimonate of lead, is found in soft pulverent ocher to compact material, in different shades of yellow color. It is the result of alteration of the sulphantimonite boulangerite. Some of the bindheimite shows the fibrous structure of the boulangerite. Some masses of bindheimite include numerous bright unaltered crystals of boulangerite. It is also found associated with sphalerite. Some of the bindheimite have small vugs which contain fine groups of mimetite crystals.

BOULANGERITE

Boulangerite, a sulphantimonite of lead of an orthorhombic structure, is the most interesting mineral found at the mine. This mineral has been found in specimens, which in size and perfection, equal the best found in any locality of the world. It is of a steel-gray color with metallic luster and brownish streak. It occurs in long, straight, compact fibrous masses; in long radiating groups; in rosettes; in slender needles, lining cavities; in tufted wool-like agregates in cavities and also massive where it has been subjected to pressure. Some of the boulangerite has been found with a fibre ten inches in length. Some specimens of sphalerite have long needles of boulangerite penetrating into them. Through alteration, the boulangerite changes into epiboulangerite (?), bindheimite and mimetite.

CALCITE

Calcite, the carbonate of calcium, occurs as rhombohedral crystals filling fractures in the dolomitic limestone. There are also small, very unusual, octahedral crystals of calcite.

CERUSSITE

Cerussite, the lead carbonate of orthorhombic habit, was found near the surface mixed with limonite.

CHALCOPYRITE

Chalcopyrite, a copper-iron sulphide, has been noted in some specimens. This mineral is common in an adjoining property.

EPIBOULANGERITE (?)

This mineral occurs with some question. A couple of small specimens of a dark bluish-gray, nearly black, color have been found. It is very rare. It is formed by the alteration of boulangerite containing more sulphur and correspondingly less antimony.

GALENA

Galena, the sulphide of lead, is one of the most common ores of lead found at the mine. It occurs massive and also with a cubical cleavage.

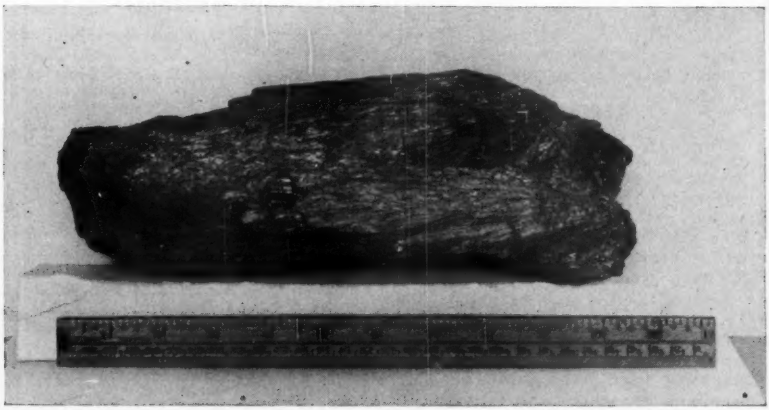


Photo by C. O. Fernquist.

Boulangerite—fiber 10½ inches long. Cleveland Mine, Stevens Co., Wash.

LIMONITE

Limonite is very common on the outcropping of the ore bodies, the whole mass being of a yellow color. It is formed by the oxidation of the pyrite.

MAGNESITE

Magnesite, a carbonate of magnesia, is found in the dolomitic limestone a short distance above the mine. In this belt of dolomitic limestone, from four miles northeast of the Cleveland mine to about fifteen miles northeast of Chewelah, there are a number of magnesite quarries. This is the largest known deposit in the United States. It is extensively quarried at Chewelah.

MIMETITE

Mimetite, a chloro-arsenate of lead, is found as tufts of minute, colorless, acicular crystals, lining cavities in yellow bindheimite. It has been formed by the alteration of boulangerite.

PYRITE

Pyrite, the sulphide of iron, is found in small cubical crystals.

PYROMORPHITE

Pyromorphite, a chloro-phosphate of lead, is reported to have been found.

QUARTZ

Quartz crystals of small size are quite common lining cavities.

SCORODITE

Scorodite, a hydrous iron arsenate, is of rather common occurrence. It is found as dull greenish, porous, masses having been formed by the alteration of arsenopyrite.

SIDERITE

Siderite, an iron carbonate, occurs in dark brown rhombohedral crystals.

SPHALERITE

Sphalerite, the sulphide of zinc, is one of the most common minerals found at the mine. It occurs mostly massive, of a brownish to black color. A few crystals have also been found. Some of the sphalerite have crystals of boulangerite projecting into them. Other specimens contain spots of bindheimite.

TETRAHEDRITE

Tetrahedrite, a sulph-antimonite of copper (silver bearing), is found mostly in close proximity to siderite.

VALENTINITE

The oxide of antimony, valentinite, has been found as small rounded, dirty octahedral crystals in limonite.

Asbestos has been known and used from the time of the Roman philosopher, Pliny, 74 A. D.

Prospectors often fail to recognize a valuable ore, owing to their unfamiliarity with other than the common minerals.

The Veta Madre, the noted silver mine, near Guanajuato, Mexico, which was first worked in 1558, was said in 1800 to have produced one-fifth of all the silver current in the world at the time.

Don't forget that if we get a wet spring on top of the hard winter we have just gone through that Nature will have done a lot of mining for you. It might pay you to go over some of the old localities and see what "Jack Frost" pried loose or what the dirt and rock slides uncovered.

The mineral collection of the late Henry Fair is for sale by the heirs of the estate. Many early minerals collected in the region about Spokane, Washington, are represented in the cabinets.

Chas. F. Marble of Ridlonville, Maine, is waiting for the winter accumulation of snow to vanish, that he may begin the season collecting. Mr. Marble has made a special study and collection of the Maine pegmatite minerals.

Here is another hint. Just after a spring rain, with the snow all gone, is a good time to look over the gravel deposits for agate nodules, jaspers, chalcedonies, etc., and to search the reefs for crystals. You can see these easier then and while they are wet than later when dry and dust and grass have covered them.

A MINERAL COLLECTING VACATION

By Mrs. H. C. Dake.
(A Collector's Wife)
962 Savier St., Portland, Ore.

While most of my friends spend their vacation at one of our Oregon beaches or mountain resorts, my husband and I spend our vacations visiting the many famous old mining camps of the West, in search of mineral specimens. Aside from the minerals there are many other interesting things to be seen at the old "ghost" towns and mineral localities.

On our most recent pilgrimage, we left Portland the latter part of July, 1929, going first to our summer home in Central Oregon, where we loaded the car with our camp equipment, which is needed in isolated regions.

Our first locality was at Antelope, Oregon, where we collected some very large quartz crystal geodes, which we shipped home, being too large to take in the car. The larger geodes when broken in half make very excellent flower pots, although husbands may not be in favor of this. We then went over the John Day Highway of Central Oregon to the mines around Prairie City, where cobalt and copper minerals were secured.

Having recently learned of a zeolite locality at Ritter hot springs, we proceeded northward, reaching Ritter on the afternoon of the hottest day of the year. The thermometer read 115 degrees and I had anticipated a nice cool plunge at the springs, but much to my chagrin found that only hot sulphur baths were available at the resort located here. Friend husband collected some attractive and interesting zeolites here.

Leaving Ritter we pressed on to Spokane, Washington, where we had the pleasure of meeting Chas. O. Fernquist, curator of minerals at the Spokane public museum. While I remained in the city to see the many collections at the museum, Mr. Fernquist and my husband made visits to surrounding mineral localities, collecting among other minerals some very fine boulangerite. The Spokane museum in addition to housing a fine mineral collection, also has very fine and large collections of other objects, many of which are of special interest to women. The fine Indian baskets and many art objects were of particular interest to me.

With reluctance we left Spokane, going for just a brief visit to Canada. Then southward over Idaho's famous "Evergreen Highway," which spans the State and is indeed a magnificently scenic and spectacular auto road. At Nampa in the southern part of the State we left the main road enroute to the old mining camps in and around Silver City, Idaho. Some of the most noted silver mines in the world were located here but are now mostly abandoned. Here friend husband collected some rich silver ores, while I was fortunate to obtain some antique objects which had been brought into the mining camp in 1868. This was our fourth visit to Silver City and during former visits had made many friends, whom we greatly enjoyed meeting.

Leaving the mountains of Silver City we pushed on across the intervening desert to the old South Mountain mining district, a locality noted as producing the best Ilvaite to be found in the United States, but rather difficult to reach due to its isolation and poor roads. As we were anxious to reach Nevada we took a short cut across the desert toward Winnemmucca, Nevada, being obliged to cross some two hundred miles of arid sage-covered desert. As night fell we made "dry camp" near the hamlet of McDermit, a typical little western desert town, which owes its existence to the sheep and cinnabar mines in the hills nearby. Some good cinnabar specimens were obtained here.

Proceeding south the following day we passed through Winnemmucca and finally

reached the Lincoln Highway at Austin, Nevada, after negotiating some rough alkaline chalk covered roads. Austin was at one time a noted mining camp, but at the present time no mining is being done and the old dumps are devoid of any mineralogical material. Our next objective was Manhattan, some hundred miles to the south through a very picturesque part of Nevada. As the day progressed pangs of hunger assailed us, but I found to my dismay that I had neglected to lay in a lunch supply and that all we had at hand was a can of sardines and some crackers. I could think of many better things for a lunch out on the hot desert, than sardines and salty crackers but being many miles from a corner grocery we were obliged to take what was at hand.

A very interesting sight in this part of the country are the playa lakes which are numerous and extend for many miles in length. The surface of these ancient lakes is usually baked hard enough to support the weight of a car. Some interesting salines are available at these localities.

Manhattan, an interesting mining camp of more recent times, is situated at an elevation of nearly 7000 feet. The dry atmosphere at these high altitudes makes the sunshine very strong and I soon learned that sleeveless and low neck dresses are not at all suitable for Nevada. My arms looked like the Realgar and cinnabar found in Nevada, but my husband assured me that the sun had nothing to do with the color of these minerals. The White Cap mine is probably the most noted mine here and many fine specimens of orpiment and realgar can be readily picked up on the huge dumps. After spending several days collecting and visiting we turned west for Reno, not that I intended parting company with friend husband, although Reno is said to be the Nation's divorce capital. Passing through Reno we visited the famous old Virginia City of the early days and stopped for the night at "Steamboat Springs," a well known resort of Nevada. We reached Sacramento, California, the following day after crossing the beautiful Sierra Nevadas and then proceeding northward to Crater Lake, Oregon, a mecca for the tourist as well as the student of geology. This lake with its precipitous rim and the marvelous deep blue of its waters is said to be the most spectacular "caldron" lake in existence. No minerals of any importance were collected here, but the fishing is excellent.

Each summer I look forward to our mineral collecting vacation, finding them more interesting and fascinating each time. It has often occurred to me that the wives of mineral collectors should derive much pleasure in taking an active part in encouraging their collector husbands. One should remember that there are many worse "hobbies" than the avocation of mineral collecting, so wives let us encourage the best.

The sixth annual meeting of the Northwest Scientific Association was held at the Davenport Hotel, Spokane, Wash., December 27-28, 1929. There was a good attendance in all departments. In the geology department, many interesting papers on the geology of Montana, Idaho and Washington were read.

Dr. F. A. Thomson of the Montana School of Mines, Butte, Mont., was elected president of the association for the year 1930. L. K. Armstrong, a Spokane mining engineer, was reelected trustee.

In the geology department, Eugene S. Perry of the Montana School of Mines, was elected president and O. W. Freeman of the State Normal School, Cheney, Wash., secretary.

The highest known point in the United States, exclusive of Alaska, is the summit of Mount Whitney, in California, which is 14,496 feet above sea level, and the lowest known dry land in the United States is in Death Valley, also in California, which is 276 feet below sea level.

The oldest known petrified forest in the world is at Gilboa, N. Y.

The September, 1928, issue of ROCKS AND MINERALS, Vol. 3, No. 3, is now exhausted and no more copies can be had. Those who have complete files to date are most fortunate for back numbers are in keen demand to complete files.

LITTLE JOURNEYS

By Albert C. Bates
Newark, N. J.

This is the continuation of an interesting series of articles on dealers and collectors that flourished forty years ago.—The Editor.

Some thirty years ago it was my great pleasure to visit, by invitation, the makers of some of the great mineral collections of the East. This was with a view partly to describe something of what I saw, the men who made them, and to become acquainted with their possessions. Perhaps the most ambitious collector was the late Col. W. A. Roebling[1], of Trenton, N. J., whose collection now permanently rests in the U. S. National Museum (Smithsonian Institute), Washington, D. C., with a large endowment for its upkeep. It was the hope of Col. Roebling to secure not only every known specie but every variety that had ever been described or determined. And to that end he kept up an untiring mailing of want lists to all parts of the world, to any persons likely to supply his desires. His collection was superbly housed in a wing of his mansion, and the display cases ideal in every way. Col. Roebling was essentially a "shut in" from injuries received during the construction of the Brooklyn Bridge and so had much leisure time to devote to his collection—as well as his business interests. Collectors visiting Washington should not fail to give all the time they can to viewing his remarkable collection at the Museum.

At the U. S. National Museum one may also see another famous endowed collection—that of the late Frederick Canfield[2] of Dover, N. J. The wonderful series of large crystals from Sussex County, N. J., will open the eyes of those collectors who possess franklinites, spinels, willemites, etc. The collection made by Mr. Canfield's father and exhibited in glass-front upright cases which were sealed up and not opened for any purpose for more than 50 years, was the basis of this remarkable collection.

And here again comes to mind the fact that the early products of many mineral localities is the best—that which comes from near the surface and which is in large measure true of many of the Sussex County deposits. And it would be a pleasure to many mineral collectors to have some observing mining expert step forward with an article for this magazine, proving or disproving this notion because it may be just a superficial view of many collectors based on insufficient data.[3]

A very beautiful collection of crystals was the one made by Geo. Vaux, Jr. of Philadelphia, Pa. Whenever I see a pyrite of any form there comes to my mind the unique suite of this mineral in Mr. Vaux's collection—mostly from French Creek, Pa. There were brilliant single crystals, so modified or elongated as to cause one to wonder at the possibilities of the shapes any mineral may take.

Often when looking through Dana's *System* at the many forms of crystals shown therein it makes one speculate whether more than one of some of the forms could ever have been found. The average collectors seldom or never meets with them when out hunting minerals nor ever sees them in collections—which saying is particularly true of quartz. It has been my experience that few collectors are interested in loose crystals because of the odd forms they may assume but rather more interested are they in the typical forms of the crystals. But these side remarks are a divergence from the subject in hand.

I first met the late Prof. W. E. Hidden when he was packing up his collection to be shipped from his home in Newark, N. J., to the Hoff Museum in Vienna, Austria. This shipment contained many of the choice crystals of beryl, emerald, amethyst and hiddenite collected by him at the Hiddenite mine, Alexander County, N. C., and other beau-

tiful specimens from the various localities in that State. He had an exquisite feeling for form and color and the appeal to him of a modified form was a pleasure to behold. I showed him at various times many such forms for the purpose of having him sketch them for me, a thing he could do with exactness and facility.

There were many fine amateur collections to be seen, not far from New York City, as that of Dr. Spencer's at Tarrytown, N. Y., or of Mr. Jones of East Orange, N. J., and others. There are more now in the making and all are not located in the East either. A new enthusiasm for this particular hobby is now being manifested according to those in a position to know. And may it wax strong and bring the pleasure to the newlywed that it once did to those who have passed on.

Editor's Note:—

(1) (2)—See—Two World-Famous Mineral Collections Donated to the Smithsonian Institute. ROCKS AND MINERALS, Vol 2, No. 1 (1927), pp. 23.

3—See—Some General Notes on Broken Hill (Australia). By M. Mawby. ROCKS AND MINERALS, Vol. 2, No. 3 (1927) pp. 89.

MINERAL COLLECTING IN SOUTHWESTERN CONNECTICUT

BY SAMUEL C. BROWN,
Stamford, Conn.

The writer, having been interested in that termed expression by the uninitiated "collecting stones" from boyhood days, thought that there might be some brother and, yes, "sister" collector in the locality mentioned that would be interested to know that a fair-sized collection may be acquired in this section of the "Nutmeg State" with very little trouble or expense.

In Stamford, at the West Avenue Quarry located about one and one-quarter miles from the center, fine specimens of blue microcline feldspar, radiations of stilbite, augite, and a few crystals of pyroxene have been found.

At Shippan Point a number of years ago a drift boulder of vesuvianite was found.

On North Stamford Avenue about two miles from the center, good sized iron garnets have been obtained.

In Rye, N. Y., about five miles west of the Connecticut State line, an outcropping of serpentine has furnished good specimens of that mineral and also altered material as deweylite and nephrite; this serpentine is spotted with chromic iron.

About ten miles northwest of Stamford in the State of New York are located the quarries of the Bedford Mining Company. The writer has visited the quarries frequently and obtained the following specimens: ilmenite, columbite, autunite on uraninite, groups of manganese garnets, beryl (green and blue), black tourmaline crystals, smoky quartz crystals in parallel position, morion (black quartz), excellent specimens of rose quartz and opalescent quartz, fair crystals of pink microcline feldspar, muscovite with magnetite inclusions, and kaolinite.

The above mentioned locality is a Mecca for all mineralogists and collectors, as the writer has never yet failed to meet one or more of that class, each with his hammer and chisel on the numerous trips he has taken to that spot. A trip to the Bedford quarries may be made from Stamford in about three-quarters of an hour by car or bus.

Another trip that is worth while is to Branchville, Conn., located on the Danbury branch of the New Haven Railroad, about one and one-half hours from Stamford. While this quarry has not been in operation for several years, it yields some very good specimens of globular mica (curved), manga-apatite, spodumene, cymatalite, eucrypite, clevelandite and graphic granite.

So far we have a collection of about thirty-six specimens from the localities mentioned which will furnish a good nucleus for a beginner's collection.

MUSEUMS OF THE WORLD

This is the beginning of an interesting series of articles on famous Museums of the world, noted for their mineral collections.—*The Editor.*

THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, N. Y.

The first section of the American Museum of Natural History was opened to the public in 1877 and contained unusually large collections, including the fine Hall Collection of Fossils of the State of New York, as well as the nucleus of the present great library, the then recent gift of Miss Catherine Wolf in memory of her father, John David Wolfe, the first President of the Museum. The next section of the Museum to be built was the east wing of the south facade, started in 1893 and completed in 1894. The west wing followed and was completed in 1895. The southeast wing was added in 1896 and the southwest corner wing in 1897. The lecture Hall was erected in 1899, and a heating and lighting plant on the north side of the Musum in 1902. The south wing of the west facade was completed in 1908 and the south wing of the east facade in 1920. The Hall of Ocean Life and Asiatic Hall were added between 1922 and 1924 and the School Service Building completed in 1926, thus giving about ten acres of floor space to exhibitions.

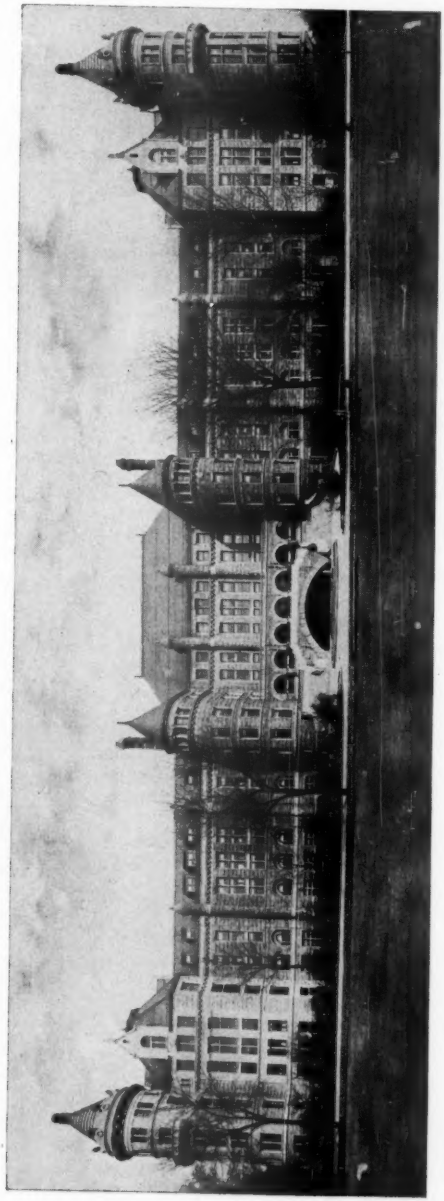
Under the administration of Morris K. Jesup, who was President from 1881-1908, the Museum was rapidly pushed forward from the scientific standpoint. In 1888 the first field expedition was sent out, supported by Mr. Jesup and Mr. Constable, the latter one of the Trustees. In that year the Department of Entomology was opened with collections showing the relations of insect life to forestry.

In 1891 Professor Henry Fairfield Osborn was called from Princeton to be Curator of Vertebrate Palaeontology and he then began his career with the American Museum which has been continued in the Presidency of the institution since 1908. The most noteworthy scientific feature of Mr. Jesup's administration was the establishment of the Department of Anthropology on an important footing under the direction of Professor F. W. Putnam of Cambridge. The Department was established in the early history of the Museum, but was not rounded out into complete form until it came under the direction of Professor Putnam, who with such men as Messrs. Boas, Saville, Bandelier, Lumholts, Smith, Jochelson and others brought the Museum forward to the highest rank in the field of Archaeology and Ethnology.

From the Department of Geology and Conchology was developed the Department of Mineralogy. This was started with the Bailey Collection of Minerals consisting of 7,000 specimens. Through the interest of Mr. J. Pierpont Morgan, this Department has come to rank first in size, value and importance in the country. One of his first gifts was the fine Bement Collection of Minerals. This was followed by the Tiffany Gem Collection exhibited at the Paris Exhibition of 1889, and later augmented by the Tiffany exhibit at the Paris Exposition of 1900.

In obtaining specimens for exhibition the first thought of the Trustees has been to secure representative series, first from the United States, then from North America, and lastly from all other parts of the world.

The Mineral Department which was thus auspiciously founded is being augmented year by year by notable collections, largely gifts. The fund developed by Miss Matilda Bruce enables the Department to keep up the work of adding to the collections and keep abreast of the times, but a more recent bequest to the Department would enable it to augment the Bruce Fund to be devoted to gem stones.



Courtesy of *American Museum of Natural History*, New York.

South Facade of American Museum of Natural History

GOLD DISCOVERED 65 YEARS AGO IN LAST CHANCE GULCH, MONTANA

The discovery of gold in Last Chance Gulch, the site of the present city of Helena, Montana, took place 65 years ago, July 14, 1865, according to a very interesting article in the *Helena Mining Review*, edited by C. R. Brazier, Helena, Mont. Credit for the discovery of gold is given to four prospectors, D. J. Miller, John Cowan, John Crab and Reginald or Robert Stanley.

At that time Lewis and Clark County, in which County is Helena, was an unpeopled wilderness and seldom visited by white men. The circumstances attending the discovery of gold in paying quantities in Last Chance Gulch was as romantic as one could wish for. After wandering all spring and part of the summer through the mountains of the State, looking for gold, the four hardy and persevering prospectors panned for gold in the gulch where Helena now stands as their "last chance." Winter was approaching and they were far from home, their food supply was getting low and it was decided to return to Alder Gulch (a mining camp) for the winter. As they turned their steps south, one of them said: "Well, boys, that little gulch is our last chance. If we don't strike it there, we'll have to streak it for home." When they panned some of the dirt they were electrified with joy to find that fortune at last had smiled upon them, for the dirt panned well and their search for gold was over.

Copies of the *Helena Mining Review*, a 32 page publication, can be obtained from the publishers, C. R. Brazier & Co., 34 National Bank Bldg., Helena, Mont. Copies are 15c each.

Courtesy of *Helena Mining Review*

Looking north on Main Street in the late Seventies, Helena, Mont.

—Photo by Davidson. Courtesy of *Helena Mining Review.*

Reproduction of painting by DeCamp, portraying early-day placer mining in Helena. This picture occupies a panel in the State Law Library.

FIELD MUSEUM NOTES AND NEWS ITEMS

Contributed by
THE FIELD MUSEUM OF NATURAL HISTORY
Chicago, Ill.

A large collection of fossils of prehistoric fishes and fish-lizards, obtained chiefly in Germany and England, is on exhibition in the department of geology.

The largest known single mass of lazurite or lapis-lazuli is on exhibition in the department of geology. It is about two feet long, more than a foot wide, and about eight inches thick. This block of the beautiful blue stone was found in an ancient Inca grave in Peru, and its shape and surface have been preserved practically as when it came from the hands of the ancient workmen.

A relief model of a volcanic island, illustrating the principal features of such islands, which are quite common in the Pacific, and among the Antilles, Canary Islands, and elsewhere, is on exhibition in the department of geology.

A large collection of fossils of the corboniferous period or "coal age", including slabs of tree trunks, well preserved stumps, roots and branches of the larger prehistoric trees, specimens of the great "horse-tail" rushes, fossil ferns, and other types of plant life, is exhibited in the department of geology.

A large black opal, unusually brilliant, about the size of a 25-cent piece in circumferenece, and weighing 14 carats, has been added to the collection of gems and jewels in H. N. Higinbotham Hall at the museum.

A gift of 26 specimens of crystallized minerals, including azurite, beryl, garnet, malachite, amethyst, jasper and other gem materials, has been received by the Museum from William J. Chalmers for addition to the large crystal collections previously presented by him.

A large collection of various kinds of fossil corals is included among the paleontological exhibits at the Museum.

An exhibit showing many of the alloys used with gold and silver, and explaining the properties resulting from the varying proportions used, constitutes one of the economic geology features at the Museum.

Oil obtained from a depth of more than a mile and a half below the earth's surface—the world's deepest oil producing well—has been received in the department of geology for the economic collections of petroleum and petroleum products. The oil is remarkable for its purity and its extraordinary high gasoline content, which is 70 per cent. The well from which it comes is 8,253 feet deep, and is located in Reagan County, Texas. It is one of the Texon Oil and Land Company properties.

Recent gifts for the department of geology include 64 quartz crystals found in McCurtain County, Okla., presented by J. H. Koester of Cicero, Ill.; 105 specimens of petroleum products from the Standard Oil Company (Indiana); 36 geodes presented by John G. Prasuhn, Chicago, Ill.; and 5 specimens of invertebrate fossils found near Galesburg, Ill., presented by H. D. Stewart of that city.

The world's largest collection of meteorites, in respect to number of falls represented, is on exhibition at the Field Museum. The importance of such a collection, according to Dr. Oliver C. Farrington, Curator of Geology at the Museum, lies in the fact that "meteorites are the only *tangible* source of knowledge we have of the universe beyond our earth."

"With other heavenly bodies we can make only such acquaintance as can be

derived from their rays of light, whereas meteorites can be handled, dissected and subjected to the same methods of scientific analysis as terrestrial substances,'' Dr. Farrington explains.

Of about 1,000 meteorite falls known to date, specimens of some 700 may be seen at the Museum, thus giving Chicago an unrivalled place for comprehensive study of these bodies. While a section or fragment serves to represent many of the falls, others are complete. Some of the Museum's specimens rank among the largest known, an outstanding one from Navajo, Ariz., weighing 3,336 pounds. From the famous Canyon Diablo, Ariz., locality, two tons of specimens are included, the largest individual weighing 1,013 pounds. From Australia the Museum has a specimen weighing more than 1,400 pounds.

''From the number of meteorite falls occurring on a measured portion of the earth, it has been calculated that an average of 900 fall annually on the earth as a whole,'' Dr. Farrington states. ''But as three-fourths of the earth's surface is covered by water, three-fourths of this number, at least, will never be found. Many others falling into desolate and uninhabited places will never be found because of lack of finders. For these and other reasons an average of only three of the 900 are actually recovered in a year. Meteorite collections therefore increase slowly. Those at the Museum represent the findings of people in many parts of the world over a period of more than a century and a quarter.

It is not known from what part of the universe meteorites come or how they originate. Theories promulgated have been that they were fragments thrown off by the earth, returning to earth; or that they were hurled earthward from the sun, the moon, from comets, or from shattered planets or planetoids. All of these except the last have been disproved, and no satisfactory proof of the planet or planetoid theory has yet been arrived at.

All known meteorites can be roughly grouped into two classes, iron and stone, plus an intermediate iron-stone class in which the proportions of these two substances are nearly equal. The stone and metal of meteorites differ in some respects from any kinds normal to the earth, having different structure and containing some compounds not occurring terrestrially.

Contrary to general belief, meteorites as a rule have little warmth when they arrive on the earth, and the tales of conflagrations caused by them are without foundation. Strangely enough, no meteorite fall has been positively known to have destroyed human life. Accounts purporting to describe such catastrophes prove on investigation to refer to events so distant in the time or place that they cannot be verified. There have been known showers of thousands of meteorites at one time and place in comparatively thickly settled communities without recorded serious injury to inhabitants.''

Dr. Farrington is author of a leaflet published by the Museum in which are presented briefly all the principal known facts concerning meteorites.

The Field Museum of Natural History has begun publication of a monthly bulletin, ''Field Museum News,'' which is to be circulated among the institution's members, now numbering nearly 6,000, it was announced recently by Stephen C. Sims, Director of the Museum. The first issue was published January 3d.

Announcements, reports and records of all the museum's activities will be published in the periodical, including notes on additions and improvements in the exhibition halls, and accounts of the work conducted in the museum's scientific research laboratories, and by its many expeditions operating in widely scattered and remote parts of the world.

Extensive and diversified activities, both at home and abroad, have been carried on during the year 1929 by the Museum, it was recently stated by Stephen C. Sims, Director of the Museum, in reviewing the accomplishments of the past twelve months.

Fourteen important scientific expeditions working for the museum have blazed their trails in widely separated parts of the world, and a fifteenth got under way just as the year closed.

A new attendance record was established at the Museum during 1929, the total number of visitors received being 1,168,430, it was recently revealed by Stephen C. Sims, Director of the Museum. This was the third successive year in which attendance exceeded one million persons, and the largest figure reached in any year of the museum's history, dating from its opening in 1894.

BUREAU OF MINES NOTES AND NEWS ITEMS

Contributed by the
U. S. BUREAU OF MINES
Washington, D. C.

The Rare and Precious Metals Experiment Station of the Bureau of Mines, in cooperation with the University of Nevada, at Reno, Nevada, has prepared a paper reviewing the present practices on the determination of mercury in ores, indicating the limitations, and pointing out how mercury can be accurately determined in the presence of various impurities.

For many years insecticide manufacturers have been the largest consumers of arsenic, utilizing more than 60 per cent of the total domestic supply, says the Bureau of Mines. The uses of arsenic for weed-killer and wood-preserver mixtures has increased; about 25 per cent of the total in 1928 was sold for these purposes and 11 per cent was sold to the glass industry. Arsenic of the highest grade is usually sold to insecticide and glass manufacturers and crude arsenic, including "flue" dust and "treater" dust, is used for weed-killer and for wood-preserving purposes.

Miners, prospectors, and mineralogists have so thoroughly searched every nook and cranny of the earth's upper crust that nowadays new minerals are seldom found, or where they are discovered, are apt to be rare, and to exist in small quantities of no particular commercial importance. Nevertheless, a new boron-containing mineral, discovered within the last five years, has been found in such quantities as to render its commercial exploitation possible, according to the Pacific Experiment Station of the Bureau of Mines.

The new mineral, which has been variously called Razorite or Kernite, is found in the Mojave Desert of California, at depths some 600 to 800 feet below the present surface of the ground. The pure mineral is colorless, transparent, and occurs in lamellar or columnar form. It contains the oxide of boron and of sodium, together with some water, and in places is of high purity, but differs markedly in physical properties from the ordinary borax of commerce. Its constitution has been of great interest to the chemist, who has hitherto known only the normal crystallized sodium borate, which contains ten molecular proportions of water to one of borate, and the octehedral sodium borate, with five molecular proportions of water. Both of these forms are readily soluble in water, the former being the sort found in nature as the result of the natural evaporation of alkaline lakes. The octehedral form is unstable with respect to water at ordinary temperatures, and is not found in nature, but can be prepared in the laboratory by crystallization above 142°F. Chemists have not succeeded in preparing the new mineral form in the laboratory, for although it contains from 3½ to 4 molecular proportions of water, it is dissolved in water only with considerable difficulty. It seems probable that the material is a product of volcanic activity.

One of the larger uses for the borate is in the manufacture of certain special glass, and for glazes of sanitary ware.

The recent history of sulphur chronicles the rise of the United States from a position of dependence upon foreign deposits to a place of dominance in world production, so that this country not only supplies its domestic market but furnishes the outside world with exports approximating 700,000 long tons annually, says Robert H. Ridgway in a report recently issued by the Bureau.

In addition to the well-known, widespread uses of clay in the manufacture of brick, pipe, tile, refractories and pottery, it has numerous odd uses, according to Paul M. Tyler in a report recently published by the Bureau. Clay, says Mr. Tyler, is used in the manufacture of ink

bottles, scouring soap, umbrella stands and insecticides. It is used in the softening of water and the adulteration of food. The urchins who signalize the opening of spring by playing marbles are boosting the clay industry, while Milady at her dressing table frequently uses cosmetics in which clay is a factor. Clay is often used as a filler for paint and paper. It enters into the manufacture of crayons, toilet and tooth powders and packing for horses' feet. The smoker contributes to the clay industry by the considerable use of pipes made of clay. Artists use clay in modeling and taxidermists find use for the material. Clay is used in the filling of cloth and the filtering of oil. It is used also in such varied materials as plaster, alum, foot rules, electrical porcelain, emery wheels, chemical apparatus, condensing worms, battery cups, pumps and pump wheels.

For the second successive year West Virginia, in 1928, exceeded all other in the production of bituminous coal. The total output for 1928, according to statistics recently published by the Bureau, amounted to 132,952,159 net tons as against 131,202,163 tons for Pennsylvania and 61,860,379 tons for Kentucky which ranked second and third respectively. When Pennsylvania's output of anthracite is included, however, the Keystone State is still far in the lead, her total production of coal of all kinds in 1928 being 206,550,232 net tons.

Apparently the only commercial sources of cadmium are zinc minerals, says the Bureau in a recently issued publication. Greenockite, otavite (a basic carbonate), przibramite (a reddish zinc blend containing up to 5 per cent of cadmium), and a few other cadmium minerals are, however, recognized. Most zinc ores contain cadmium in minute quantity, and the cadmium of commerce has all come from the following sources: Zinc ores treated by fractional distillation; baghouse fume from lead smelters treating zinciferous ores; and residues from the purifications of zinc solutions at electrolytic zinc or lithopone plants.

Canada is the largest exporter of crude gypsum in the world, shipping 824,536 short tons valued at $1,240,987 in 1928, according to the Bureau which has completed a statistical summary of the Canadian gypsum industry. The production of gypsum is one of the oldest industries in Canada and, in point of gypsum output, Canada ranks third among the countries of the world.

For the year 1929 Utah ranked first in the Union in the production of silver, second in copper after Arizona, and third in lead after Missouri and Idaho, according to estimates compiled by the Bureau.

MINERAL LOCALITIES INFORMATION DEPARTMENT

Members desiring information regarding minerals or mineral localities in the following states may obtain it by writing to the Collectors listed and enclosing a self-addressed stamped envelope.

THE NORTHWEST—Washington, Idaho, Montana, Oregon and parts of British Columbia	Charles O. Fernquist, Curator of Mineralogy, Public Museum, 2316 First Avenue, Spokane, Wash.
Oregon, Southern Idaho, Northern Nevada	Dr. Henry C. Dake, 793½ Thurman Street, Portland, Ore.
The Oregon Coast, South and Western Oregon, Northern California, Southern Washington	John M. Tracy, 601 Orange Street, Portland, Ore.
Petrological Information in Central Eastern Iowa	Prof. Wm. J. H. Knappe, Curator, Wartburg College Museum, Clinton, Iowa.

THE GEM DEPARTMENT

Conducted by
GILBERT HART

Each issue Mr. Hart will give in this department information concerning gems and gem minerals. As Mr. Hart invites correspondence relating to the department, letters should be addressed to him as follows:

Gilbert Hart, St. Edwards University, Austin, Texas.

OPAQUE GEMS

Gems are usually brilliant transparent minerals whose great beauty lies in profusion of flashes of light from their interior; but fancy has often caused dull opaque minerals to be used in the same manner for personal adornment. An important member of this class of rare opaque gems is native gold, whose nuggets are mounted in rings and scarf-pins. Such gold gems are common in the Northwest, and had a wide vogue at the time of the Klondike rushes. Similar nuggets of native platinum or of its more valuable sister iridosmine are also used. These metallic jewels are not cut or otherwise disturbed from their natural state and are practically the only stones ever seen exactly as found by the miner. The vogue of nugget gems arises from knowledge of rarity of the metal and its high intrinsic value, but the extent of their use is usually limited to the vicinity of the discoveries of the metals.

Similarly related to the precious metals are the "radium" gems. The fabulous prices of radium compounds led to use of uranium minerals as gems. Among these are such as microlite and gadolinite, transparent minerals of good luster, which are facetted and are of value to the aesthetic sense as well. The dull and opaque uraninite, gummite and euxenite have a small percentage of radium, enough to be ores of that element, and because of that content of the extremely valuable metal have been used for rings in spite of their inherent ugliness. "Radiumite" is a name given to a rather attractive mixture of several radio-active minerals, all of which are opaque or feebly translucent. Use of these gems was widest shortly after the public knowledge of the great value of radium, and has recently dwindled to almost none.

Another class of this unusual use of opaque objects is the mounting of small fossils for brooches or pins. Trilobites of perfect outline and of dull black or brown colors have been thus used, as have several other types. The perfection of preservation of the structures of these ancient animals is extremely interesting, and their value as gems depends almost entirely on this perfection.

In the 1870's "marcasite" jewelry was prominent, and of recent months it appears to have again increased in popularity. The marcasite of the jeweler is usually pyrite of the mineralogist. It is the old familiar "Fool's Gold," but has a sufficiently different color from gold to offer pleasing contrast when facetted in rings or buckles. Commonly it is used in connection with the more usual gems, as it lends itself well to the color schemes of modern composite jewelry.

Several other minerals, ores of the common metals, have been used in this same manner. Among them are the blue covellite of the copper mines, brassy cobalite, and the brilliant brown sphalerite. Two arsenic sulphides, realgar and orpiment, of contrasting red and yellow, are often found in intimate intergrowth. The resulting cabachon cut from them is unusual in brightness of colors. Malachite and azurite, commonplace copper minerals, in similar intergrowth furnish a combination of blue and green in agate like bandings or in patterns suggestive of cubist art. Other ores, such as iron and manganese oxides (heterolite), the franklinite-willemite-zincite intergrowth (black, pink and red) of Franklin Furnace, and the rare copper arsen-

ides of Lake Superior, are in this category.

Intergrowths of other minerals are noted in the partially translucent chalcedonies. Bloodstone and typical banded agates belong here, as do such unusual color combinations as myriekite. Chalcedony, when pure, is clear and colorless or white. Inclusions of opaque minerals cause most of the striking chalcedonic gems, even though most of these inclusions are very finely divided within the siliceous matter. Jasper, prase, sardonyx, and flint are varieties of this same mineral.

Similar semi-opaque gems are found in jade or nephrite which has been used since prehistoric times by all peoples. Today the very latest Parisian creations often include jade as the background for delicate compositions in pearls and diamonds. Serpentine is normally a soft mineral, used in the arts only as a building accessory, but occasionally hard specimens of bright green, delicately banded with white calcite and black chromite veins, are found in the jewel box. Blue, with contrasting bits of yellow pyrites, in the lapis lazuli was formerly a highly prized stone.

Before the adoption of facetting, when cabachon cuts were the rule, brilliant red and black hematite was often used in rings and its kin, magnetite, was also cut for larger pieces especially where its magnetism could be shown. Under the name "Jet" many black minerals have been sold as a mourning stone. The best of these is black tourmaline, which has a brilliant luster to enliven its solemn color. Anthracite coal is similarly brilliant and takes a high polish, but it is easily fractured and quickly loses its luster.

Several other opaque minerals are occasionally of service to the lapidary, but their use is small and often of short life, associated as it is with some other reason than that of beauty which is always connected with the precious gems. In this group of fleeting popularity are to be found many rocks, collections of small mineral crystals of different sorts. Lavas are productive of many rock gems, especially the rhyolitic lavas which have been altered by subsequent activity. Porphyritic rocks, those with large crystals enclosed within a finely crystallized ground of varicolored species, form other interesting gems.

In general this type of gem, cut from opaque minerals or from rocks, is of small value and often of very limited use. Opaque minerals when crystallized within transparent ones furnish the cause for many more valuable jewels, such as sagenitic stones and cat's eyes of varied sorts. But per se, the short summary of their use as given above is sufficient for all but the most industrious gem collector or student.

U. S. CIVIL SERVICE OPPORTUNITIES

For those who are interested we are pleased to announce the following open competitive examination to be held in the near future by the U. S. Civil Service Commission, Washington, D. C.

Assistant Geologist, $2,600 a year.

Applications must be on file with the Commission at Washington, not later than March 12th.

The examination is to fill vacancies in the Geological Survey. Full information may be obtained from the U. S. Civil Service Commission, Washington, D. C.

THE BRAIN OF MAN

By Joseph N. Prokes,
Jackson, Minn.

Some time ago a scientist, kneeling on a rock of the eastern shores of the United States, studied with intense care the first known footprints of a dinosaur.

Those footprints were made not less than ten million years ago when the hard rock upon which the record has been kept was soft and yielding sand.

Almost at the same time another scientist, on the other side of the country, was looking into the largest reflecting telescope that science has ever known and peering millions of miles farther into space than human eyes had ever before penetrated.

For the first time new worlds were visible, new solar systems were looked upon.

Light which had been traveling for years at the stupendous rate of 186,330 miles per second, flashed upon the observer's retina and told him its story of a world new to human knowledge.

Wonderful as is the instrument that pierces the unknown of the skies and interesting as are the footprints of that ancient beast, still more wonderful and far more interesting are the brains of those two men piercing time and distance to learn the lessons of the centuries and the far-off worlds.

To the man who bends over the impressioned stone all the millions of years since the dinosaur walked there are as an open book. To the geologist the history of the world is as plain as the written tale or the branching of the family genealogy. Upon the blackboard he can sketch for you the story of our earth from far beyond the dinosaur down to the last layer of forest leaves. He can tell you the story of the ages with as great accuracy as he can recite the unimportance of yesterday.

It is the brain of man that is the most wonderful thing of which the finite knows. It is the ability to think, to reason, to put facts in their proper sequences and draw therefrom the logical conclusion, that surpasses any other of God's creations.

It was the thinking power of man that made the telescope possible and brought it to its present efficiency. It was the thinking power of the human brain that has mapped out the past; placed upon the written page the accurate history of the earth and its inhabitants and made each one of us the heir of all the ages.

And yet there are men who pay more money to their barber than they do to the bookseller; who can find more enjoyment in the banalities of a "show" than in the pages of a history or the written thoughts of the world's great masters.

POSSIBLE CANADIAN PRODUCTION OF RADIUM ORE

The occurrence of small quantities of radioactive minerals in granite pegmatite dykes in Ontario and Quebec was noted many years ago, when some of these dykes began to be worked for their mica or feldspar content. A considerable variety of rare-earth minerals, many of them radioactive, have been yielded by such dykes, but not in commercial quantities. Recently, however, prospecting in the Wilberforce district of central Ontario has resulted in the discovery of a deposit of uraninite that appears more likely to prove of commercial grade than any hitherto found in Canada.

According to H. S. Spence of the Mines Branch of the Dominion Department of Mines, the occurrence of small quantities of uraninite in a pegmatite dyke outcropping about one mile east of the village of Wilberforce, in Haliburton County, has been known for some years, but it is only during the last few months that a definite uraninite-bearing vein has been discovered. This vein is the first of its type to be found in Canada and possibly is unique of its kind. It has been uncovered for a length of 150 feet by the removal of a light dirt cover, and has been traced by outcroppings for a further

400 feet; its full length, however, has not yet been determined. Its width varies from five to ten feet. The uraninite occurs as scattered crystals or nodular masses through the vein-matter, some of the masses weighing several pounds. The vein has been subjected to considerable leaching by surface water, and much of the uraninite secured has been found as loose material in open cavities. The waters of springs issuing from the hillsides below the vein are reported to be strongly radioactive.

Several hundred acres of land around the discovery have been acquired by a Toronto syndicate, the Ontario Radium Corporation, Limited, 539 Confederation Life Building, Toronto, and this company intends to proceed with development. Arrangements have been made with the Mines Branch of the Dominion Department of Mines to conduct a large-scale concentration test upon a car-load shipment of ore. The results of this test will be of interest, since it should determine whether the deposit possesses a sufficiently high radium content to justify exploitation. Analyses of the Wilberforce uraninite show a uranium oxide content of from 65 to 70 per cent and a thorium content of about 12 per cent.

Uraninite is a crystallized form of pitchblende, the richest commercial ore of radium, and is the mineral mined at Joachimsthal in Czechoslovakia, and in the Belgian Congo. From these deposits the greater part of the world's supply of radium has been obtained.

COMMENT AND CRITICISM

To the Editor of "R & M":

As a subscriber to ROCKS AND MINERALS and one from the beginning, I want to cast my vote in favor of the monthly issue. It has been my contention that the magazine does not come out often enough, especially to us amateurs. I believe I have mentioned this to you before. You can depend on me living up to every demand on your part—just send me the bill.

Without a doubt, every subscriber will be in harmony with your proposition. $2.00 will be a small price for twelve issues of a magazine of this kind. It is chuck full of informing and instructive reading to those interested in mineralogy. To those who are more advanced in the study and to the novice, I am sure favorable replies will be forthcoming.

I would like to mention the fact that I have made purchases from several dealers who advertise in ROCKS AND MINERALS and have found them reliable in every way. Their specimens have been first class and as represented.

Looking foward to the monthly—and accept my best wishes for a joyful Holiday Season and a New Year of Health and Prosperity.

J. LELAND JORDAN,
Dec. 17th, 1929. Westminster, Md.

To the Editor of "R & M":

Please find enclosed check to cover my renewal for a period of five years. ROCKS AND MINERALS is a wonderful magazine and in my estimation it ranks with the leading mining journals. I would not be without it for twice its cost.

THOMAS CHILDS,
Rowood, Arizona.

To the Editor of "R & M":

I think it will interest the readers of ROCKS AND MINERALS to know that on Election Day, when the New York Mineralogical Club made an excursion to Paterson, N. J., we found at the Trap Rock Quarry, at Prospect Park, a large quantity of bornite (partly permeated by silica) together with covellite and melaconite. The two latter minerals were partly coating rock and partly impregnating sandy veins near the bornite. It is, of course, obvious that the covellite and melaconite had been formed through a decomposition of bornite. Near and intergrown with the bornite are small veins of stellated quartz, the quartz groups having a diameter of about ½ inch. The quartz appears quite black and is coated with a glossy black mineral which as yet has not been identified.

P. WALTHER,
Elizabeth, N. J.

A COMPILATION OF GEM NAMES

By Gilbert Hart
St. Edwards University, Austin, Texas

Mr. Hart and Rocks and Minerals will be glad to have readers send in additional gem stone names not here included or suggestions as to any corrections in names which they believe should be made.

This is a continuation of the very interesting compilation of gem names (the largest ever printed) made by Mr. Hart, the first installment of which appeared in the December, 1927, issue of the magazine. This list will be continued until completed.—The Editor.

Nephrite—name used for either tremolite or actinolite when tough and compact with splintery fracture; gem names: **Ax Stone, Hatchet Stone, Jade, Kidney Stone, New Zealand Greenstone, Punamu Stone, White Jade, Yu Stone.**

Nevada Diamond—obsidian, artificially discolored.

New Rock—bone turquoise, compare with "old rock" which is true turquoise.

New Zealand Greenstone—nephrite, from New Zealand; (2) serpentine, richly colored, from New Zealand.

Nicolo—quartz, onyx, base black or brown, with top layer wavy bluish white.

Night Mare Stone—quartz, flint.

Nigrine—rutile, dark brown to black.

Noble Opal—precious opal.

Noble Serpentine—serpentine, rich oil green color, translucent.

Novaculite—fine-grained hard sandstone or quartz rock; (2) quartz, flint.

Obsidian—glassy lava, usually dark colored.

"Occidental"—applied to imperfect true gems, or to substitutes for true gems.

Occidental Agate—quartz, agate, less perfect than oriental agate.

Occidental Amethyst—quartz, amethyst; (2) also used in reference to purple corundum.

Occidental Cat's Eye—quartz, cat's eye.

Occidental Chalcedony — chalcedony, somewhat opaque.

Occidental Diamond—quartz, rock-crystal.

Occidental Topaz—quartz, yellow.

Occidental Turquoise—bone turquoise.

Ocean Spray—gypsum, satin spar.

Octahedrite—tetragonal, usually in pyramids; hardness 6, specific gravity 3.9; oxide oftitanium. Gem names: **Anatase, Blue Schorl, Wiserine.**

Odontolite—bone turquoise.

Oeil de Boeuf—labradorite (French for **Ox Eye**).

Oisanite—epidote, yellowish green.

Old Rock—turquoise from Russia.

Oligoclase—member of feldspar group of silicates, triclinic, massive, colorless; hardness 6, specific gravity 2.66; mixture of albite and anorthite; gem varieties: **Aventurine Oligoclase, Moonstone.**

Olivene—orthorhombic, usually massive green; hardness 6.5 to 7, specific gravity 3.32; silicate of iron and magnesium; gem varieties: **Celestial Precious Stone, Chrysolite, Evening Emerald, Golden Stone, Hyalosiderite, Job's Tears, Peridot, Precious Chrysolite.**

Olivene—trade name for any green stone.

Onegite—quartz, with hair-like inclusions of goethite.

Onicolo—onyx, variety of quartz, used for cameos, the white top layer has a bluish tinge.

Onychite—quartz, onyx.

"Onyx"—applied to various banded or clouded rocks with prefixes of different type.

Onyx—chalcedony, banded, usually cloudy milk-wite and some other color, usually black.

Onyx Marble—calcite, stalagmite.

Onyx Stone—quartz, onyx.

Oolite—calcite, massive concretionary limestone made up of minute spherical grains.

Opal—amorphous, prabably colloidal, massive, and reniform; commonly white, but opalescent; hardness 5.5 to 6.5, specific gravity 2.15; silica and water in varying amounts; gem names: **Amber Opal, Black Opal, Cacholong, Cacholong Opal, Chloropal, Common Opal, Fiorite, Fire Opal, Flash Opal, Forcherite, Fossil Pineapple, Geyserite, Girasol, Girasol Opal, Gold Opal, Harlequin, Harlequir Opal, Hyalite, Hydrophane, Isopyre, Jasper Opal, Jaspopal, Lechosos Opal, Lithoxyle, Liver Opal, Magic Stone, Menilite, Milk Opal, Moss Opal, Mother-of-Opal, Muller's Glass, Noble Opal, Opal Agate, Opal Jasper, Opal Onyx, Opaline, Opalized Wood, Oriental Opal, Pealite, Pearlite, Pear Opal, Pin Fire Opal, Pipe Opal, Pitch Opal, Prase Opal, Precious Opal, Quinzite, Radio Opal, Resin Opal, Semiopal, Smoky Opal, Sobrisky Opal, Sun Opal, Vermillion Opal, Vermilite, Water Opal, Water Stone, Wax Opal, White Opal, Wood Opal, World's Eye, Xylopal, Zeasite.**

Opal—used as prefix or suffix indicating either (1) an opal of the color or type mentioned, (2) admixture of opal with some other gem, of (3) opalescent variety of another gem.

Opal Agate—opal, banded in alternate layers of opal and agate (chalcedony).

Opal Jasper—opal, with many impurities, rendering stone opaque.

Opal Onyx—opal, alternate layers of common and precious opal.

Opalescent Chrysolite—chrysoberyl, opalescent.

Opalescent Sapphire—corundum, opalescent.

Opaline—opal matrix, (2) pale blue to bluish white opalescent corundum.

Opaline Feldspar—labradorite.

Opalized Wood—wood petrified by opal.

Ophicalcite—serpentine.

Ophiolite—serpentine.

Ophite—serpentine.

Orange Topaz—quartz, smoky quartz changed to yellow by heat.

Orbicular Silica—quartz, beckite.

Oregon Jade—vesuvianite, californite.

Oriental—prefix used with some other gem name to indicate a variety of corundum having color of the gem named.

Oriental Agate—quartz, agate, finely marked and very translucent.

Oriental Alabaster—aragonite.

Oriental Amethyst—corundum, purple, (2) exceptionally perfect true amethyst.

Oriental Aquamarine—corundum, light green.

Oriental Cat's Eye—chrysoberyl cat's eye, (2) corundum, smoky.

Oriental Chalcedony—chalcedony, very translucent.

Oriental Chrysoberyl—corundum, yellowish-green.

Oriental Chrysolite—corundum, greenish yellow, (2) chrysoberyl.

Oriental Emerald—corundum, green.

Oriental Garnet—almandine.

Oriental Girasol—corundum, girasol.

Oriental Hyacinth—corundum, rose to aurora-red.

Oriental Jasper—quartz, bloodstone.

Oriental Lapis—lapis lazuli.

Oriental Moonstone—corundum, pearly.

Oriental Onyx—aragonite, banded, mottled or clouded stalagmites, (2) unusually beautiful true onyx.

Oriental Opal—opal, imported to Europe from the Orient, often originating in Hungary.

Oriental Peridot—corundum, green.

Oriental Ruby—corundum, ruby.

Oriental Sapphire—corundum, blue.

Oriental Smaragd—corundum, green.

Oriental Sunstone—corundum, girasol.

Oriental Topaz—corundum, yellow.

Oriental Turquoise—true turquoise.

Orpiment—orthorhombic, foliated, yellow; hardness 1.5 to 2, specific gravity 3.45; sulphide of arsenic.

Orthoclase—member of feldspar group of silicates, monoclinic, massive, usually white or pale shade of red or green; hardness 6, specific gravity 2.57; silicate of potassium and aluminum; gem varieties: **Adular, Adularia, Aventurine Orthoclase, Heliolite, Ice Stone, Lazurfelspar, Leelite, Lennilite, Moonstone, Murchisonite, Orthose, Rhyacolite, Sanidine, Sunstone, Valencianite, Variolite.**

WITH OUR MEMBERS

Miss Ethel Doane of Bridgewater, Mass., is a lecturer to women's clubs on semi-precious stones. She tells her audience of the part stones have played in history and fable. She explains the various families or groups of stones, and gives her hearers a fund of information on this subject which is not only fascinating but educational and useful, especially to women. Her talk is accompanied by a display of many handsome stones and unusual specimens from her private collection which feature adds much to the program.

Howard M. Irish of Buckfield, Maine, a noted lapidary and gem cutter, believes himself to be the first to find pink pollucite and also to identify green and pink californite in his native State. He plans to reopen the famous Mount Mica gem mines this year.

Wilbur B. Murbarger, mineral collector and placer miner of Steilacoom, Washington, is now conducting operations on his gold placer grounds near Grant's Pass, Oregon. Mr. Murbarger, while enroute to Grant's Pass, stopped at Portland to call on Dr. H. C. Dake and view his collection of minerals.

George W. Scott of Ft. Collins, Colorado, has some very interesting minerals available for exchange.

Hatfield Goudy of San Francisco made a mineralogical pilgrimage to the region about Yosemite Park.

Our old friend W. H. Matchett of Hoquiam, Washington, has installed a complete lapidary outfit and is now prepared to cut and polish the many fine agates in his cabinet, which he has spent years in acquiring.

William C. McKinley of Peoria, Ill., reports that fair specimens of jasper are found in Dry Run, a small creek in Bradley Park, in his city.

T. P. Pettigrew, publisher and Nature student, of Roanoke, Illinois, has recently placed mineral collections in the schools of his town for the benefit of the younger generation.

M. Mawby of Broken Hill, Australia, has taken a position on the faculty staff of the school of mines in his home town.

An effort is being made by the mineral collectors residing in and around San Francisco, to organize the mineral collectors of the Pacific Coast into a mineralogical club.

Fred Pough of St. Louis, Missouri, recently made a new "find" of some very excellent and spectacular fluorites, at a locality in Illinois. The specimens are of a fine purple color and distinctly show the phenomenon of "built up corner" crystals.

Charles Fernquist, curator of minerals at the Spokane, Washington, public museum, has during the past year added many hundreds of fine specimens to the museum collection. This collection is without doubt the finest and most complete to be found in the Pacific Northwest. Any of our members visiting in Spokane will receive a very cordial welcome if they will call on the genial Mr. Fernquist.

We are grieved to learn of the recent deaths of D. L. Brace of Portland, Oregon, and Reginald Wherrie of Los Angeles, Calif. Mr. Brace was a member of Rocks and Minerals Association from the time of its inception. Our friend, in addition to being an ardent mineral collector, was also a lover and collector of fine fossils and Indian relics.

Mr. Wherrie was one of our youngest members, just 11 years old, who was keenly interested in ROCKS AND MINERALS and its success, and we are very sure that the mineralogical fraternity has lost a valuable member in his passing on.

To the relatives and friends of our recent members our heartfelt sympathy is being extended them.

WITH OUR CONTRIBUTORS

Dr. W. F. Foshag, Curator of Mineralogy and Petrology at the U. S. National Museum, Washington, D. C., and an Honorary Vice-President of the Rocks and Minerals Association, has most kindly prepared for us the article, "Some Minerals and Collections in the U. S. National Museum."

Those of us who are so fortunate as to live in or near Washington, or to be in that city, will surely plan to visit the National Museum and to see and examine the many marvelous minerals on display there—for the collection at the National Museum is one of the largest and finest in existance.

We are very sure our readers will enjoy this article and will look forward with pleasure to other articles on minerals in the U. S. National Museum that Dr. Foshag may care to send us.

Charles O. Fernquist, Curator of Minerals at the Public Museum, Spokane, Wash., favors us with a very interesting article, "Boulangerite and the Associated Minerals of the Cleveland Mine, Stevens County, Wash."

The minerals and mineral localities of northeastern Washington are not very widely known by mineral collectors and as the boulangerite from there is equal to the best found anywhere else in the world, we believe we are very fortunate in obtaining this interesting article and we hope Mr. Fernquest may find time to write us another article on the minerals of his State.

W. E. Howarth of the National Museum of Wales (Geological Department), Cardiff, England, is another new contributor to this issue whom we wish to introduce to our readers. His article on Millerite is a most interesting and valuable one and will appeal to all collectors who may have this rather rare mineral in their collections. We are very sure that after reading this article collectors will be on the alert for millerite when searching through rocks liable to contain this mineral. We trust Mr. Howarth may favor us with another article for a future issue.

Those of our members who are married and whose wives may not be in sympathy with their mineral collections or mineralogical excursions, will read with interest the article in this issue—"A Mineral Collection Vacation," written by a collector's wife, Mrs. H. C. Dake, of Portland, Oregon.

We are very sure that this article will create considerable interest and discussion and we would not be at all surprised to receive a contribution from some other wife who takes keen interest and pleasure in her husband's collection. We await with interest the reactions from this article.

Another new contributor to this issue is Samuel C. Brown of Stamford, Conn., whose little article should be of special interest to those of our readers living in or near the localities he mentions. As Mr. Brown states in his article that a fair sized collection may be acquired from his section of the State with very little trouble or expense, we trust that many of our readers and members will avail themselves of the opportunity to visit these localities and collect some specimens for their collections. We believe that every collector should have a representative collection of minerals found in his State, county or locality.

THE ROCKS AND MINERALS ASSOCIATION

PEEKSKILL, N. Y., U. S. A.

Organized to stimulate public interest in geology and mineralogy and to endeavor to have courses in these subjects introduced in the curricula of the public school systems; to revive a general interest in minerals and mineral collecting; to instruct beginners as to how a collection can be made and cared for; to keep an accurate and permanent record of all mineral localities and minerals found there and to print same for distribution; to encourage the search for new minerals that have not as yet been discovered; and to endeavor to secure the practical conservation of mineral localities and unusual rock formations.

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If you are not a member of the *Rocks and Minerals Association* you are cordially invited to join.

Subscribing Membership Blank will be found in the pack pages of the magazine.

PUBLICATIONS RECENTLY RECEIVED

Gems and Gem Minerals—A catalog of the Goetzke Collection. Prepared by Anna H. Gilbert of the Science Department under the direction of John Cotton Dana—28 pages, 1 illustration. There is on exhibit in the Newark Musuem of Newark, N. J., one of the most complete collections of gem stones in the country. It is the result of twenty years of the patient and persistent study of his hobby by a Newark citizen, Mr. Otto Goetzke, and embraces five thousand specimens, drawn from every corner of the world. Members living in Newark or traveling through the city should avail themselves of the opportunity to visit the museum and to examine this very fine collection.

The catalog lists the minerals on display under names, varieties and localities, an important feature being that it embraces trade names also.

THE PRESIDENT'S PAGE

JUDGING VALUES IN MINERAL SPECIMENS

By Dr. Henry C. Dake

One of the greatest difficulties often confronting the mineral collector is that of placing an estimate on the value of a specimen. While it is quite impossible to follow any set rule due to the many factors entering into an estimate of this nature, the writer will attempt to offer a few suggestions.

First we consider the number of specimens available. Assuming the "find" of a new mineral species, it is obvious that if the supply is limited to a few specimens the value will and should be high, even though the material may be massive and not at all attractive. While on the other hand if the "find" is large and the material be well crystallized the value would be judged lower according to the number of specimens available. The degree of rarity is thus an important factor in specimen values. Often a very common mineral of an unusual form, color, shape or variety may command a much higher value than another species which may be relatively rare. Specimens of the more common minerals from localities which are exhausted and hence no longer available are naturally more valued than the same species from localities where a good supply can be yet obtained. Many very fine specimens of the common minerals which were obtained many years past at localities now obsolete, are to be found in old collections and museums and are justly highly pized.

The commercial values of a specimen must also be taken into consideration. Specimens of the precious metals may hold little mineralogical interest and may be relatively common, yet hold great intrinsic value. As a rule a large gold, silver or platinum "nugget" is of no scientific value unless it has some unusual genetic feature. Minerals which are classed as gem material must be valued in accordance to their commercial values, and if cut and polished the cost of same added to the specimen. As a rule the cost of cutting and polishing the semi-gem materials like agate is much greater than the value of the rough material. The harder the mineral the greater the labor and cost of cutting and polishing, aside from this feature, hardness is only a minor factor. The finely carved ornaments, of quartz and jade, for example, often have an enormous value due to the skill and labor necessary to produce same.

Chemical composition must also be considered and minerals containing the rare elements are valued according to the percentages contained and their rarity. Species having an unusual chemical composition or one of scientific interest, even though not rare are in demand and hence valued higher.

The form of a specimen is important in determining its value and it goes without saying that as a rule the most attractive, highly prized and valuable specimens in any collection are the well crystallized ones. Large, nearly perfect, crystals with brilliant and unbruised faces, or groups of these crystals, are not at all common even in the most familiar species. The most valuable crystal is usually one attached to the matrix in such a manner that the contrast of color and form shows best its beauty and symmetry to the best advantage.

Many of the best matrix crystal specimens have been "developed" to some extent by the judicious and careful use of small chisels and chemicals to remove matrix material from around the crystals.

Beauty and size in a specimen are also factors effecting the value. Beauty does not enhance the scientific value, but it is of importance if the specimen is to be used for cabinet or museum purposes. An irregular shaped or poorly trimmed specimen tends to detract from its value.

The following salient points can be taken into consideration in estimating the value of a specimen:

(1) The commercial value if any.
(2) Its rarity and supply available.
(3) Crystallization — size, perfection and color of crystals.
(4) Beauty, size, color and symmetry.
(5) Scientific value if any.

MEMBERSHIP DEPARTMENT

New Members Enrolled—Oct. 20, 1929—January 20, 1930.

We are grateful for the interest displayed by some of our members and advertisers during 1929 and we wish to extend our thanks to them for their cooperation in securing new members. We hope that this interest may be continued during 1930 and that many more of our friends may show a similar interest so that our membership may be increased at a substantial rate.

The more members we have the larger and stronger will be our Association and the better will be our magazine. Interest your friends and have them join. Those who secure five or more members will be listed on the HONOR ROLL.

THE HONOR ROLL

New Members Secured During 1929 by:

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The officers of Rocks and Minerals Association are highly gratified with the rapid growth in the membership roll during the past several months. We send thanks to the many dealers in minerals who have aided the Association by their kind help and cooperation.

GENERAL INDEX OF AUTHORS AND CONTENTS

VOLUME IV

Acknowledgments 77
Africa: A Brief Description of the Tin Fields of Northern Nigeria . 1
Arsenic, Its Uses and Misuses 12
Bailey, E. M. 121
Bates, Albert C. 40, 94, 112
Bentonite, a Mineral of many possibilities 110
Berman, Harry 78
Blank, Eugene W. 37, 81, 113
Bureau of Mines, U. S. 120
California: Death Valley and the Borates of 73
Cahen, Edward 12
Canada: A Famous Hill 10
Chips from the Quarry 126
Clinton, C. L. 118
Colorado: Mineral Localities of .. 106
Comment and Criticism 127
Contributors, With Our 25, 65, 93, 123
Dake, Dr. H. C....9, 29, 69, 98, 108, 131
Diamond, Benjamin T., M. A. 22, 124
Diamonds in the United States ... 37
Dolomite, More about the $5,000 8, 44
Editorial 26, 66, 96, 130
Fene, W. J. 86
Gedney, E. K. 78
Gem Department 20, 84, 122
Gem Names, A Compilation of.. 17, 48, 92, 116
Gold Rush in City Street 19
Hart, Gilbert 17, 20, 48, 84, 92, 116, 122
Hoadley, C. W. 10, 77
Horn, Aubrey E. 1
Hunt, Dr. Walter F. 71
Idaho: Ilvaite at South Mountain 9
Index: of Authors and Contents Vols. I, II, III 30
Of Mineral Species, Vols. I, II, III 32
Lewis, T. J. 42
Little Journeys 40, 94, 112
Maine: A catalog of Minerals found at Rumford 121
Huge Beryl Crystals at Albany 78
Marble 71
Membership Department 99, 132
Meteorites: Visitors from the Skies 118
Mineral Collecting, A Review of 50
Mineral Localities Information Dept. 84, 105
Mineral Production of the U. S. in 1928 11
How the States rank in 47
Montana: The Mines Exhibit 129
Museum, Field 90, 114
New Jersey: Agate found in an abandoned quarry 109
The occurrence of Breunnerite .. 77
Notes and News Items: Field Museum 90, 114
U. S. Bureau of Mines..... 120
Opal, The: Beauty most maligned 103
Oregon: Quartz at Antelope 108
Over, Jr., Edwin 106
Quartz and Chalcedony 61
A real "Rock" crystal 119
Rose quartz 43
Paleontology Department 22, 124
Pennsylvania: Caverns of 81
How Overbrook was put on the map in 1905 42
Penn State Polylith 113
President's Page 29, 69, 98, 131
Publications recently received 65
Reamer, Louis 109
Riffle, A. 21, 64, 95, 128
Rocks and Minerals Association 27, 67, 97, 130
Sluice Box, The 21, 64, 95, 128
Sulphur, Genesis of 74
U. S. Civil Service Opportunities 65, 129
Utah: Mining of Gilsonite in 86
Vonsen, M. 73
Walther, P. 24, 61
Yates, Jr., J. William 103